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A WANDERER'S NOTES ON FOREIGN WATER SUPPLIES

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Public water supply has only been a matter of large consideration in the United States for a period of about ninety years, which may be divided for discussion into three groups of thirty years each.

In the first, the scattered "old oaken buckets" and the historic town pumps began to be superseded by central pumping stations, delivering river water into bored log distribution pipes, or in a few instances into cast iron pipe, imported chiefly from Scotland; storage cisterns were built and some measure of fire protection was given by the bucket brigades and multiple hand power pumps, but rare was the house that had other than a single tap and that usually in the back yard.

In the next period, sanitation began to receive attention, pressure was found necessary, and reservoirs conserved stream flow, at elevations to give gravity service, and of course cast iron replaced wood for pipes.

The epoch just closed was conspicuous in its earlier years through the extensive operations of private ownership franchise grabbing concerns, many of whose projects ended in financial disaster and as a logical outcome of giving away franchises without proper restrictions the more recent municipal ownership fad.

Now the country is well started on lines of bettering the sanitary surroundings of water supplies, developing high pressure fire protection systems, softening hard waters and valuing plants for just rate making, together with more efficient management.

This Association deserves much credit for the advance.

But for these notes, discussion of a paltry ninety years is not the thought; rather a few brief references to water systems of twice and thrice nine hundred years ago.

In Egypt the exhaust of the gasoline pump sounds oddly where it replaces the brown skinned Shadoof raisers (fig. 1), the patient



FIG. 1. RAISING WATER BY THE SHADOOF, ALONG THE NILE, EGYPT

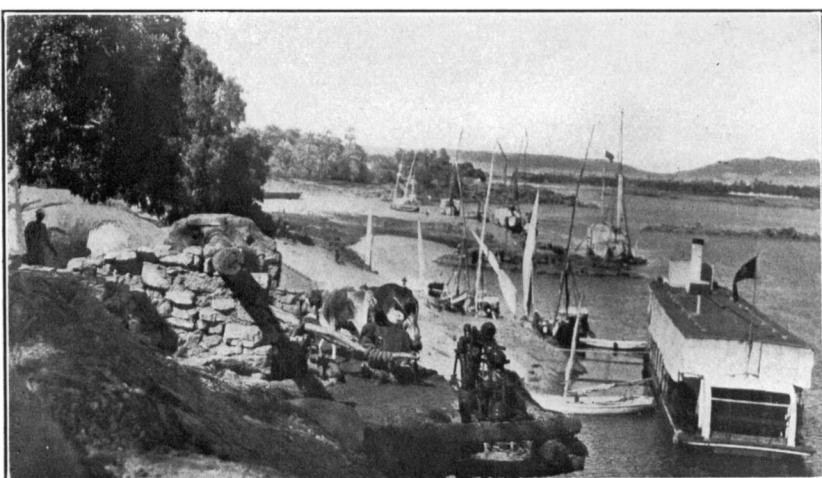


FIG. 2. SAKYIEH, ANIMAL POWER—ENDLESS CHAIN—BUCKET HOIST—ELEPHANTINE ISLAND, OPPOSITE ASSOUAN, EGYPT

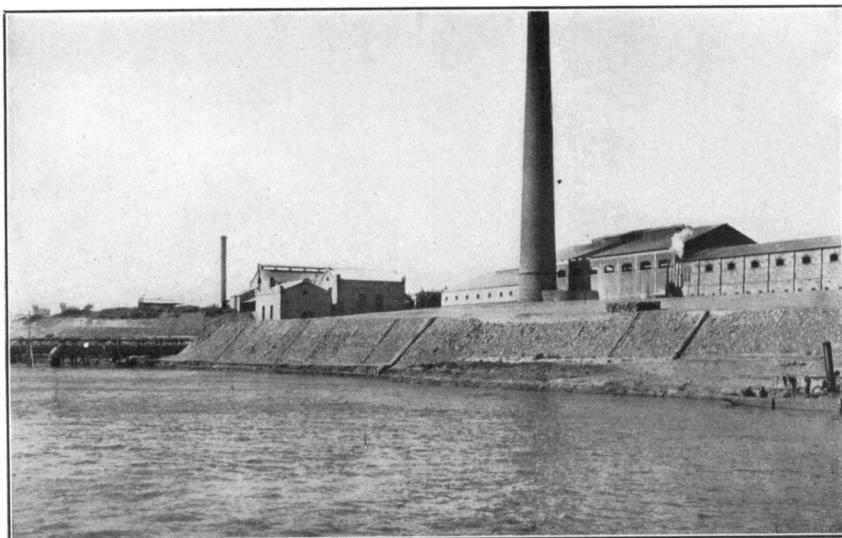


FIG. 3. ENGLISH IRRIGATION PUMPING STATION—ON THE NILE NEAR KOM OMBO, EGYPT



FIG. 4. WATER CARRIERS AT ESNEH, EGYPT

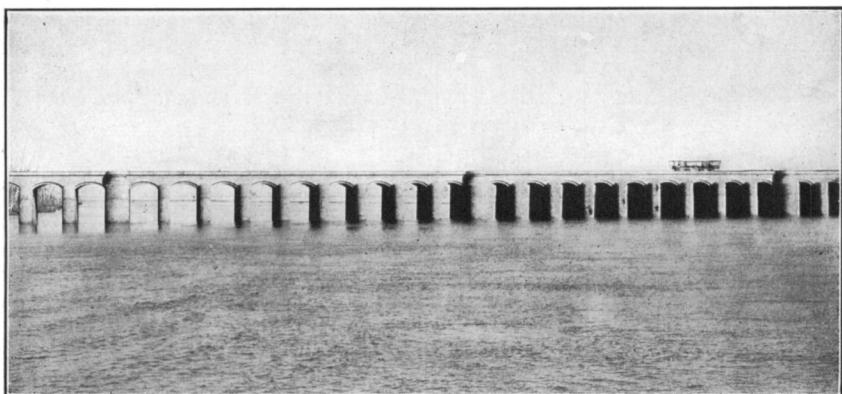


FIG. 5. REGULATING DAM (OR BARRAGE) ACROSS THE NILE NEAR ASSIOUT, EGYPT. LOW STAGE AND GATES CHIEFLY OPEN

circling donkey, ox, or camel raising the Sakyeh's endless chain of buckets (fig. 2), or the Michigan-built Archimedes Spiral. Two great steam plants for irrigation look oddly out of place on the banks of the Nile (fig. 3), but probably many a year will still pass before the women carrying earthenware jars on their heads, or donkeys with goatskin bottles will cease to be the village water purveyors (fig. 4).

Modern Cairo has a new piped water system with driven well supply and an excellent fire department service, but in the older portions the picturesque water carrier performs his semimusical functions as in the cities of our near neighbor, Mexico.



FIG. 6. TOP OF ASSOUAN DAM, EGYPT, DURING THE RAISING OF ITS LEVEL BY SEVEN METRES. FEB. 1910

The two problems in Egypt, of irrigation and water supply, are so intimately associated that work done primarily in interest of the former, will also facilitate to large degree, a solution of the latter.

The three great regulating dams crossing the Nile at Assiout (fig. 5), Esneh and Assouan (figs. 6-7) will retain for low water stages the advantages accruing during high water, with virtual elimination of the damage and inconvenience from uncontrolled flooding.

Most of the branch irrigation canals have heretofore been out of commission during low Nile (fig. 8), but with the enormous pond-

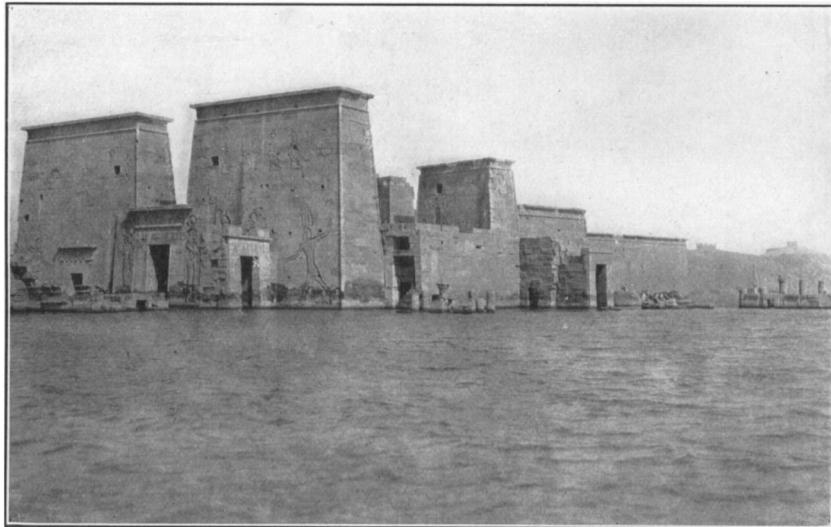


FIG. 7. TEMPLE ON THE ISLAND OF PHILAE, SUBMERGED BY WATERS IMPOUNDED BY ASSOUAN DAM—THE NILE, EGYPT

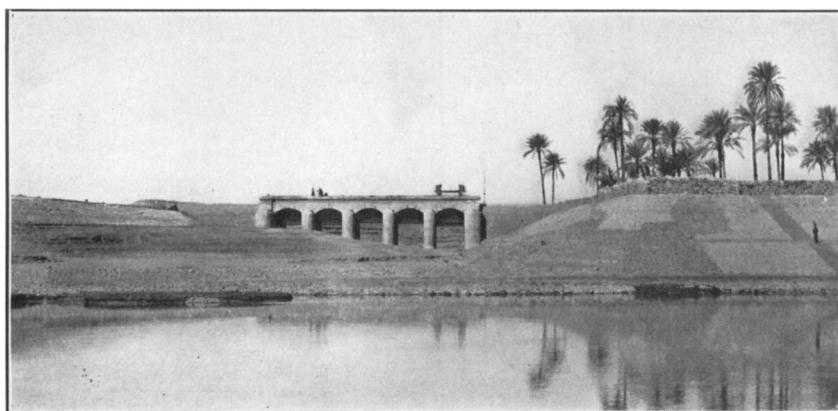


FIG. 8. ENTRANCE TO IRRIGATION CANAL—THE NILE, EGYPT

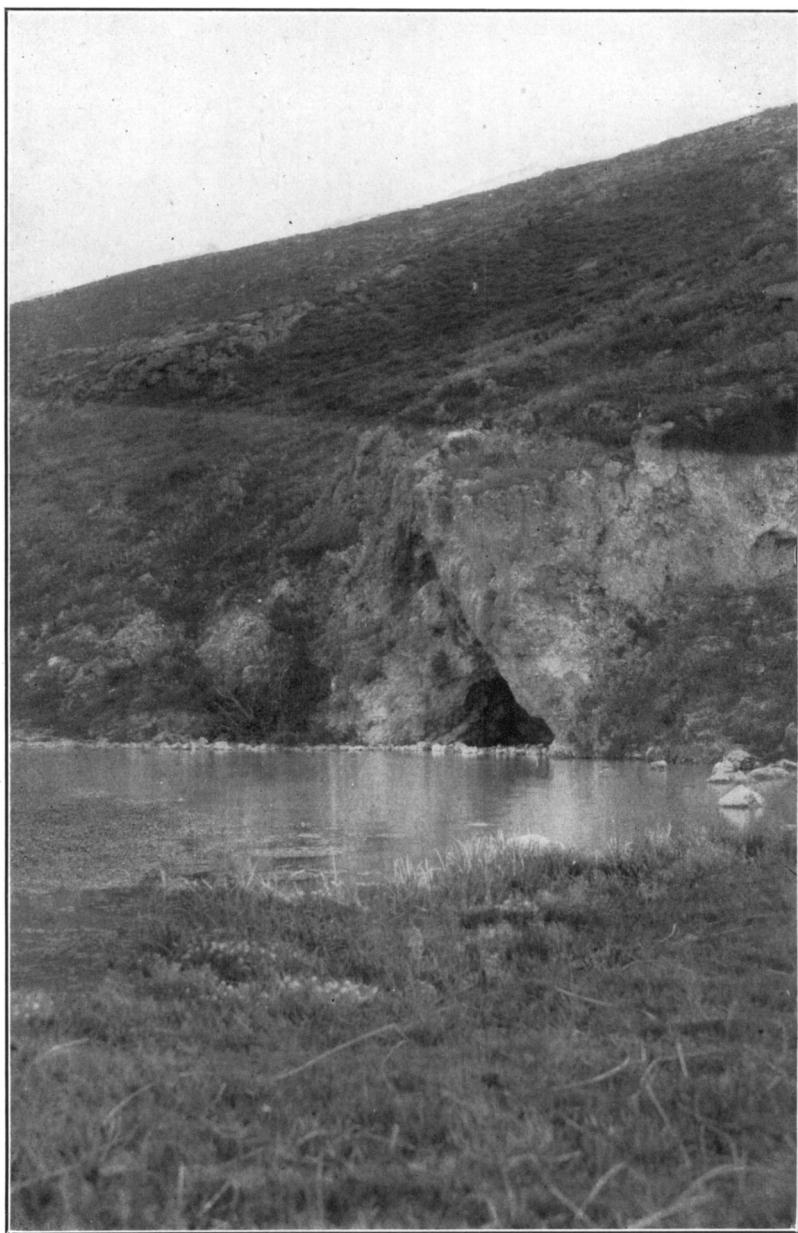


FIG. 9. GIDEON'S FOUNTAIN OR HARADS SPRING, FOOT OF MOUNT GILBOA—PALESTINE

age by the raised Assouan Dam, that condition will be largely remedied.

Many theories have been evolved as to the why and wherefore of the Sphinx; may we not advance a new one: Does it not represent an honored water works superintendent, instead of old King Kephren? Cut from the rocks of the hills in grateful appreciation, by Rameses the Great in recognition of the superintendents bearing the brunt of the kicks and growls of the enraged water



FIG. 10. ELISHA'S FOUNTAIN NEAR OLD JERICHO, PALESTINE—"BITTER WATERS TURNED TO SWEET"

users when the filter systems failed to remove the Nile's suspended matters. The stony stare acquired by long years of experience fully demonstrates the theory.

In touring Palestine, many a relic of an ancient conduit and canal may be observed, and in some instances one is inclined to believe that originally crude water power lifts were utilized to raise portions of the water to higher level canals or conduits (figs. 9-10). Generally springs were protected with stone curbing, and often

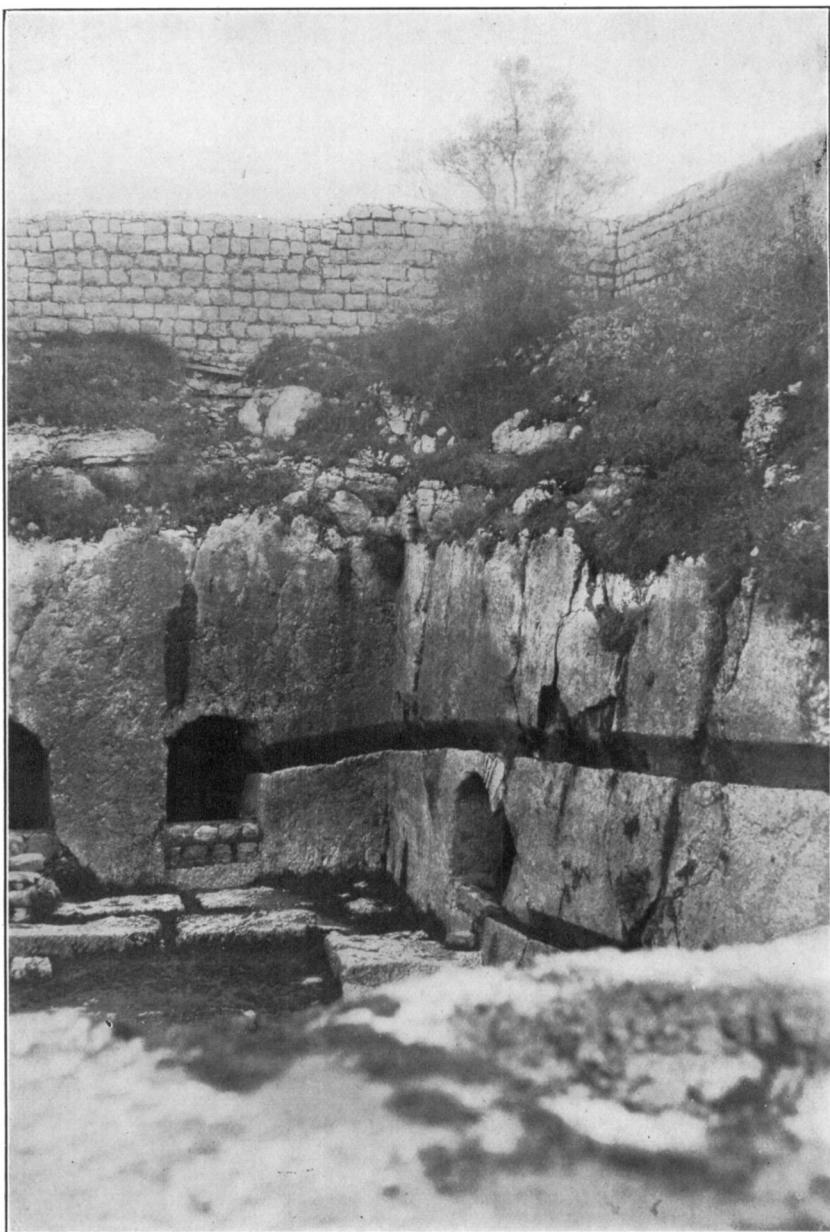


FIG. 11. ROCK CISTERNS—SIDE WALL CONDUIT (INFLOW) JERUSALEM, PALESTINE

partially roofed over; in some cases wholly so. Jerusalem is supplied from great stone cisterns, springs cleaned out and walled up; every drop of water being valuable (fig. 11). King Hezekiah is credited with the construction of a very interesting winding, well-graded rock tunnel, some 1700 feet in length, $2\frac{1}{2}$ feet in width and $4\frac{1}{2}$ feet in height, conducting overflow waters from one of the middle level springs down to the famous Pool of Siloam (fig. 12), in which neighborhood washing is done, and from which the family water supply is carried away in the universal earthenware jars.

The mountains upon which Jerusalem is built are of limestone liberally fissured and caverred; a number of these not containing springs themselves have been enlarged and converted into storage reservoirs, called "pools" into which the jars are dipped. In view of limited water facilities, and perhaps inclination, bathing, aside from washing the face, hands and feet, is naturally a good deal of an annual custom, obligatory, however, at the Passover time, when clothing too must be clean or new, and household utensils be thoroughly washed or else be renewed.

Mohammedans are equally scrupulous as to the same degree of cleanliness; it is wise, however, to visit such lands before hot weather or after the annual rehabilitation of person and apparel.

Our own next door neighbor, Mexico, also has some such very praiseworthy habit of at least annual cleansing. Though a far cry from Palestine some similarity of customs and development suggests a word as to Mexico before continuing a jaunt in the "Near East." Several cities early constructed arched conduits to carry water at the hydraulic grade, and they still furnish fairly abundant municipal supplies.

Sometimes the Mexican structures were artistically embellished at important points (fig. 13), the suggestions, however, probably came from Europe rather than originating in the country, and are of Middle Age era rather than the early Christian centuries.

The spring at Guadelupe (fig. 14) is associated with an old legend to the effect that it came into existence when the Virgin Mary stepped on the ground, presumably to visit the cathedral which had been erected in her honor as the result of certain miraculous directing of an old Indian devotee, whose blanket she had impressed with an effigy of herself. As vouching for the truth of the legend the pictured greasy blanket hangs, framed in silver, in the cathedral's altar.

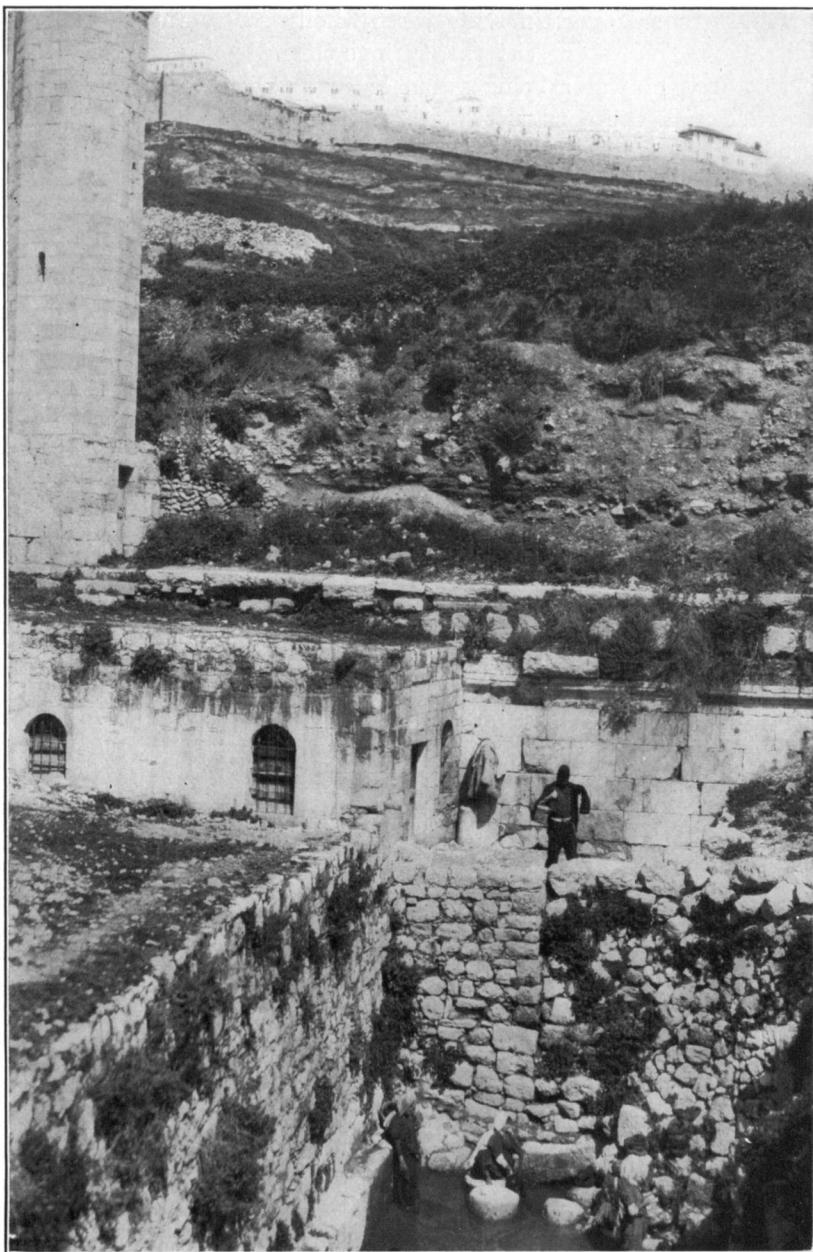


FIG. 12. POOL OF SILEOAM AT FOOT OF HEZEKIAH'S TUNNEL—WALLS OF JERUSALEM AT TOP OF PICTURE—PALESTINE

The ancient cities of Asia Minor, Ephesus being typical, were well provided with public water supplies, ruins of arches supporting graded conduits still standing (fig. 15), though the present natives have reverted to the early and primitive carrying from the pool or spring; and storks have adopted some of the remaining towers for their homes, thus typifying the perennial springs of life.

Constantinople in very early days developed mountain sources into a municipal supply, conveying the water by several underground conduits to extensive covered columned cisterns (fig. 16),



FIG. 13. FOUNTAIN—MEXICO

whose presence in the city would be entirely unsuspected as buildings usually completely cover them.

One of the largest is near famous old San Sophia, and is entered by a stone stairway from a stable yard. That yard may be well drained away from the opening, but then again it may not.

From these cisterns the water is piped to numerous artistically decorated public fountains, and seems of excellent quality until one imagines the possibility of other stable yards; then bottled water from Switzerland becomes suddenly more attractive.



FIG. 14. SACRED SPRING—GUADELUPE, MEXICO

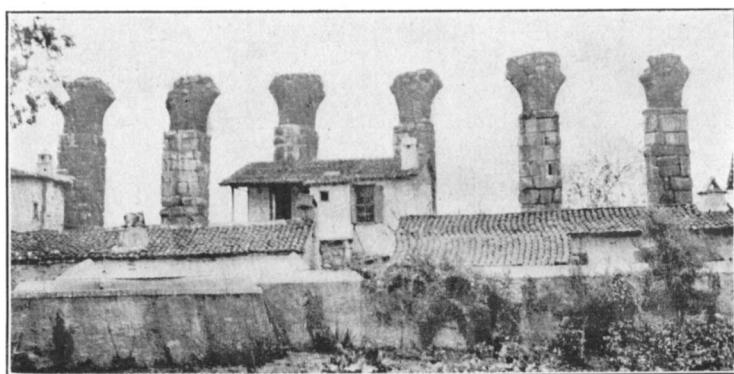


FIG. 15. RUINS OF ANCIENT AQUEDUCT—EPHESUS, ASIA MINOR

Every ancient city having Greek or Roman influence made much of public water supply, their baths being historic, the daily gathering places, not alone of patricians but of plebeians also.

In Old Corinth, said to have been one of the most luxurious and wickedest cities of all times, there still stands a portion of the ancient bath (fig. 17), and ruins of the market and forum and temple of Apollo. From the spring flows today as of yore, the water that filled the tanks, but now through wrought-iron pipes, supplying

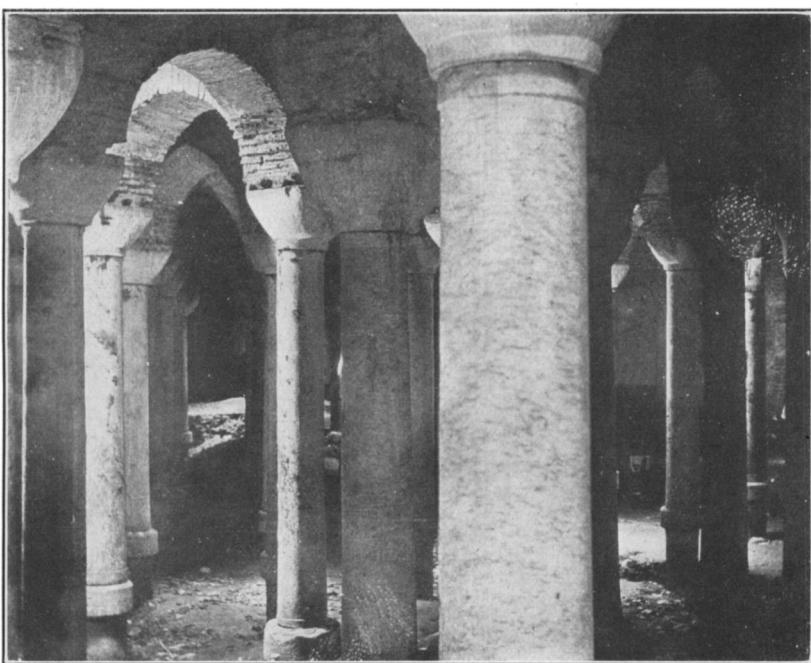


FIG. 16. RESERVOIR OF THE 1000 COLUMNS, CONSTANTINOPLE, TURKEY

the modern village farther down-hill, the ancient and modern somewhat incongruously meeting.

All the world knows of the Roman aqueducts, the more ancient ones being carefully preserved as tourist attractors (fig. 18), while some still serve present day populations through the public fountains. These public fountains were as abundant in old Pompeii as the wineshops and that is saying a great deal.

Lead and earthenware pipes were both used for distribution.

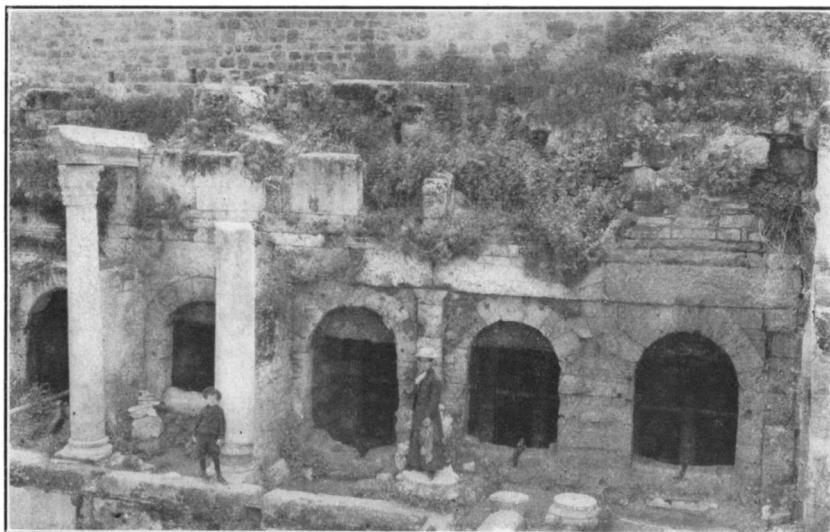


FIG. 17. RUINS OF BATH—OLD CORINTH, GREECE—SOURCE OF WATER SUPPLY FOR MODERN CORINTH

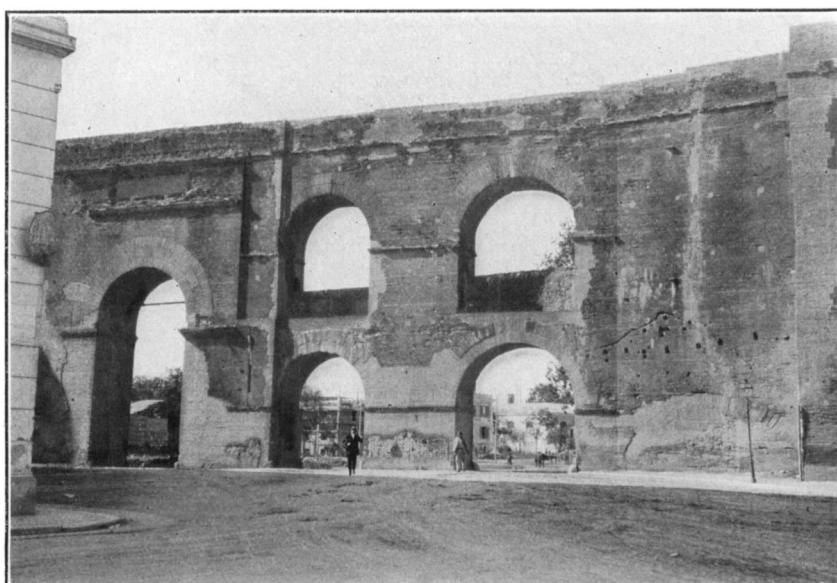


FIG. 18. OLD ROMAN AQUEDUCT, ITALY



FIG. 19. STREET FOUNTAIN—CROSSING STONES—RUINS—POMPEII, ITALY



FIG. 20. HOUSE OF PANZA, SHOWING FRONT COURT FOUNTAIN—POMPEII, ITALY

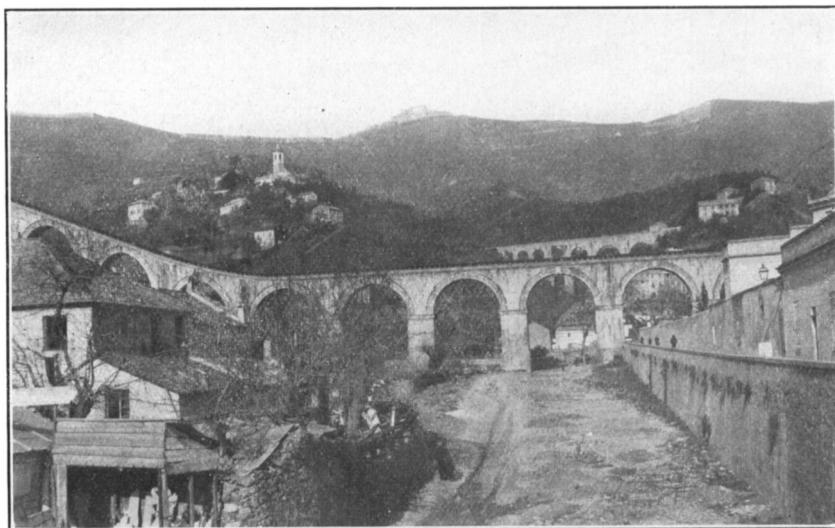


FIG. 21. AQUEDUCTS—GENOA, ITALY



FIG. 22. BEGINNING OF GREAT AQUEDUCT THAT SUPPLIES THE FOUNTAINS AT VERSAILLES, FRANCE

The illustration (fig. 19), shows one of the street-side white marble drinking troughs for horses and the inflow nozzle for man. Then may also be noted the crossing stones for pedestrians, raised about 15 inches above the street pavement, not to provide against mud or water, but because the pavement was usually protected against wear by that depth of earth. Horses did not wear shoes, so that the pavements, or literally foundations for the earthway, were thus covered for their comfort also. White marble corner tablets cut with letters and figures indicated street names and districts; those shown in the picture are as uncovered recently, from their burial in A.D. 79 by the eruption of Vesuvius that destroyed Pompeii and Herculaneum.

The House of Panza (fig. 20), representative of the more palatial houses exhibits the typical front court water pool, probably not used so much for bathing as for adornment and fancied coolness.

In Genoa ancient and modern conduits are side by side, both in use (fig. 21); one using the hydraulic grade on the hill contours, the other siphonage across the valley.

At Versailles, a great aqueduct (fig. 22) is filled with water pumped from the Seine through pipes for a short distance, then gravity flow to the great fountains (fig. 23) which first charmed royalty and its visitors and since then several generations of tourists.

Another odd water system, strictly modern, however, serves the inhabitants of Gibraltar. About ten acres of mountain side have been smoothly concreted and provided with grooves or ditches, (fig. 24), the concrete acting as a precipitation agent, condensing the moisture laden breezes coming from over the Mediterranean, while the grooves collect and convey the water into underground rock-hewn cisterns. Very abundant success cannot be claimed, but everything goes that yields some water for the inhabitants of the "Prudential's" rock.

This paramount commodity of life has been, perhaps, more abused, less protected and less intelligently handled by civilized moderns, until very recent years, than any other necessity, little having been learned or heeded from the works of antiquity, and even today cities grudge the expense of even half-way protection, instead of being anxious to do all that is possible for conservation, purification and maximum economy in use of that marvelous mixture of gases which, combined, is called "water."

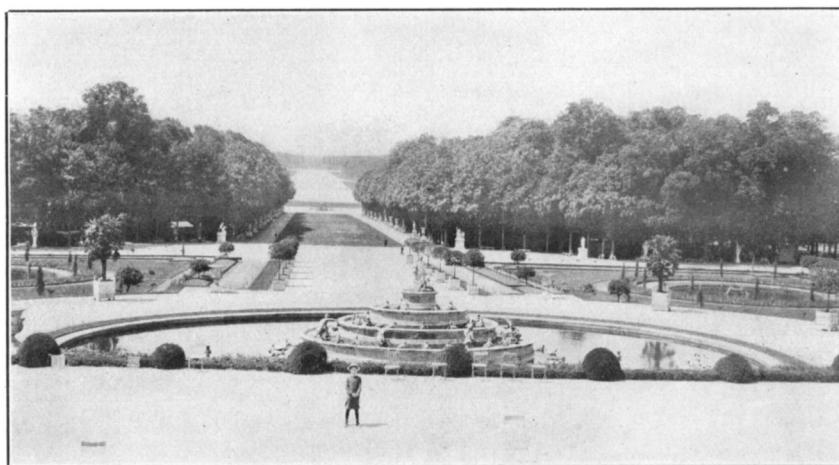


FIG. 23. ONE OF THE GREAT FOUNTAINS—VERSAILLES, FRANCE

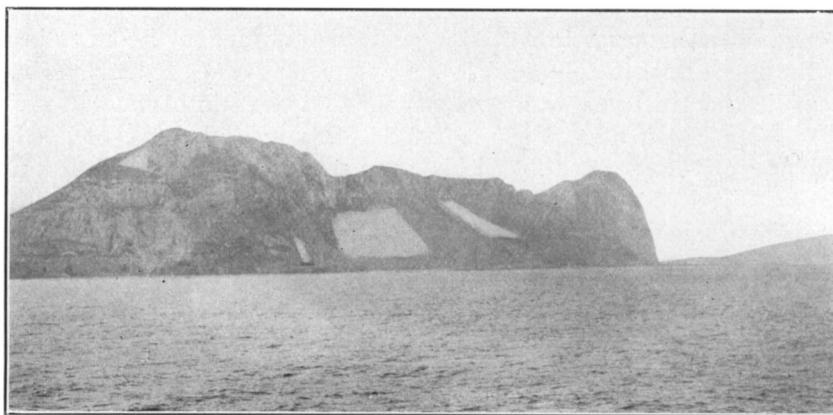


FIG. 24. CONCRETE COLLECTING SLOPES FOR GIBRALTAR'S WATER SUPPLY